UNITED STATES PATENT OFFICE.

GEORGE W. LEIMAN AND WILLIAM H. LEIMAN, OF NEW YORK, N. Y.

SAND-BLAST MACHINE.

No. 807,036. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed June 3, 1905. Serial No. 263,545.

To all whom it may concern:

Be it known that we, George W. Leiman and William H. Leiman, citizens of the United States, and residents of the borough of Manhattan, in the city and State of New York, have invented a new and useful Sand-Blast Machine, of which the following is a specification.

This invention relates to a sand-blast machine with the object in view of providing a continuous blast of great efficiency.

In the accompanying drawings, Figure 1 is a view of the machine in perspective. Fig. 2 is a vertical section. Fig. 3 is a view in detail of the sand-ejecting nozzle, and Fig. 4 is a view in detail of the means for preventing clogging at the start.

The body of the machine is denoted by 1 and is supported upon legs 2, the top being slanted and provided with a transparent window 3 for enabling the observer to watch the effect of the sand upon the article which is being operated upon. The body is provided with arm-holes 4 and 5, to the walls of which flexible sleeves 6 and 7 are secured, as is usual, to protect the forearms of the operator down to the wrist, and for the purpose of preventing the waste of sand which may lodge around the wrists of the operator and which when the operator's arms are withdrawn has heretofore been scattered on the floor we provide a slanting wall 8 along the front of the machine below the arm-holes, the lower edge of said wall being attached to the front of the machine, forming a kind of trough or hopper immediately underneath the arm-holes for catching the waste sand, and from this trough we provide an opening 9, covered by a trap-door 10, for the purpose of passing the sand from the hopper into the body of the machine, to be brought again into use.

The bottom of the body of the machine slants rearwardly, as shown at 10, and the sides converge toward the top of a sand-receptacle 11, from which the sand is blown to do its work. In the sand-receptacle 11 there is located a funnel-shaped inlet 12, with its larger end lowermost and located slightly above the bottom of the sand-receptacle, so as to leave a layer of sand at all times between the end of the inlet-funnel 12 and the bottom of the sand-receptacle. From the top of the said inlet-funnel 12 a sand-feed pipe 13 extends upwardly and then curves over at its upper end and downwardly into a mixing-chamber 14. The mixing-chamber 14 has a contracted lower portion 15, from which the sand-ejecting spout or nozzle 16 projects, and in alinement with said nozzle 16 within the mixing-chamber we locate an air-jet tube 17, which extends downwardly into the gradually-contracting bottom of the mixing-chamber and terminates a short distance above the top of the ejector-nozzle 16 for the purpose of permitting the sand from the sand-feed tube to flow down the mixing-chamber into the space around and below the air-jet tube 17. The air-supply pipe 18 leads from the air-jet tube 17 upwardly and off in any desired direction to a suitable supply of air under pressure. (Not shown.)

The sand-feed pipe leads into the side of the mixing-chamber above the lower end of the air-jet tube 17, so that the discharge of air from the air-jet tube into the sand-ejecting nozzle produces a suction tending to draw the sand from the sand-tube 9 to the extent of removing air-pressure from the sand-feeding tube and leaving the sand free to be forced up without any back air-pressure.

A sand-lifting jet of air under pressure is conducted by means of a pipe 19, leading from the air-supply pipe 18 to the bottom of the sand-receptacle, where it opens into the sand-receptacle immediately below the mouth of the sand-inlet funnel 12. This sand-lifting jet-pipe 19 is provided with a valve 20 for controlling the amount of air-pressure which shall be admitted to the bottom of the sand-box to lift the sand through the sand-feed pipe.

To prevent the sand from settling down and forming an obstruction to the flow of the sand-lifting air-jet in starting the machine, we provide an agitator consisting of a short plunger 21, which is seated in the bottom of the tubular extension 22 at the bottom of the sand-box and which is capable of a limited vertically-reciprocating movement across the end of the pipe 19, where it connects with this tubular extension at the bottom of the sand-box. By simply forcing the plunger 21 upwardly and permitting it to drop back to its seat the sand which may have settled in a compact mass at this juncture is readily loosened to permit the sand-raising jet to work effectively.

In operation the amount of air-pressure required to force the sand from the sand-box to the sand-ejecting nozzle is reduced to a minimum, because of the suction produced at the discharge end of the sand-feeding pipe, and the jet of air which drives the sand against the surface to be operated upon is directed along the axis of the sand-ejecting nozzle, so that the sand which is distributed around it and which reaches the sand-ejecting nozzle under a considerable velocity due to the freedom with which it is forced through the sand-feed pipe has its motion accelerated to a high degree of efficiency, causing the work to be done very rapidly and economizing air under pressure.

What we claim is—

1. In a sand-blast machine, a mixing-chamber, a sand-ejecting nozzle in communication with the mixing-chamber, an air-jet nozzle located within the chamber with its discharge end in proximity to the inlet end of the said nozzle, a sand-feed pipe opening into the mixing-chamber at a point above the discharge end of the air-jet tube and means for lifting dry sand through the sand-feed pipe.

2. A sand-blast machine comprising a mixing-chamber, a sand-feed tube connected with one side of the chamber, a sand-ejecting nozzle connected with the chamber, an air-jet nozzle projecting within the chamber past the end of the sand-feed tube and in alinement with the sand-ejecting tube, a sand-receptacle and an air-jet tube connected with the sand-receptacle for lifting dry sand from the receptacle through the sand-feed tube.

3. A sand-blast machine comprising a mixing-chamber, a sand-ejecting nozzle connected with the mixing-chamber, an air-jet tube projecting into the chamber in alinement with the sand-ejecting nozzle, a sand-receptacle, a sand-feed tube having a funnel-shaped inlet located within the sand-receptacle and having its opposite end connected with the side of the mixing-chamber at a point above the mouth of the air-jet tube and an air-tube connecting the air-supply pipe with the interior of the sand-receptacle below the mouth of the said feed-pipe whereby suction is produced upon one end of the sand-feed pipe and pressure upon the opposite end by the action of the air.

4. In a sand-blast machine, the combination with a sand-receptacle, a sand-ejecting nozzle, means for directing an air-jet through the sand-ejecting nozzle and means for directing an air-jet to the interior of the sand-receptacle, of a sand-feed pipe having its discharge end located in proximity to the air-jet directed through the sand-ejecting nozzle and its inlet end within the sand-receptacle in proximity to the end of the air-jet pipe connected therewith whereby suction is produced at one end of the said feed-pipe and pressure at the opposite end.

5. In a sand-blast machine, the combination with a sand-receptacle, a sand-feed pipe and an air-jet located in the sand-receptacle for lifting the sand from the receptacle into the sand-feed pipe, of a mechanical agitator located at the juncture of the sand-receptacle and air-jet pipe for loosening the sand in starting the machine.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 1st day of June, 1905.

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WILLIAM H. LEIMAN.

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SANDBLAST MACHINE.

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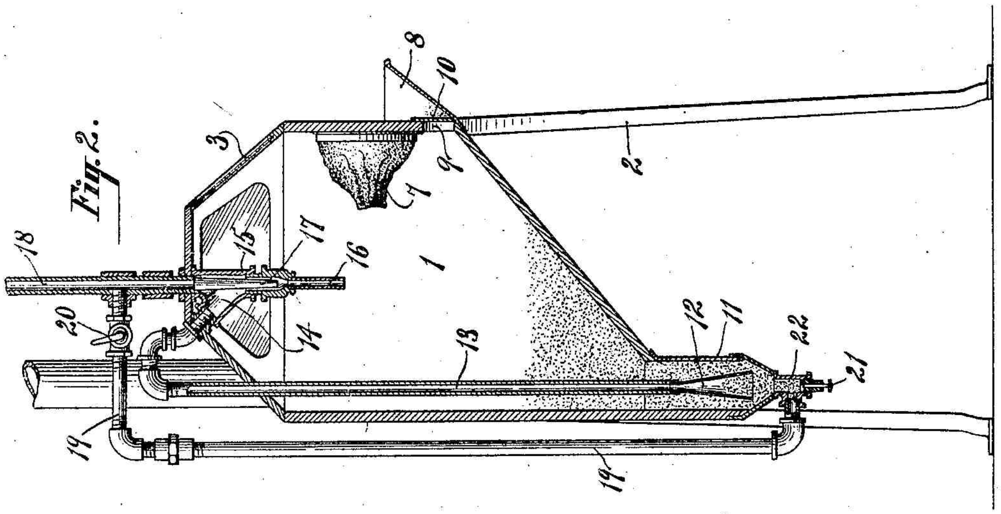

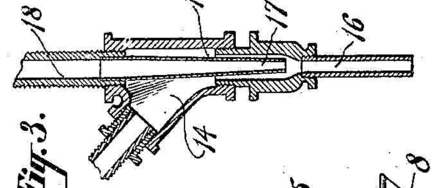

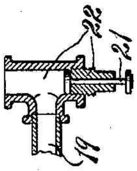

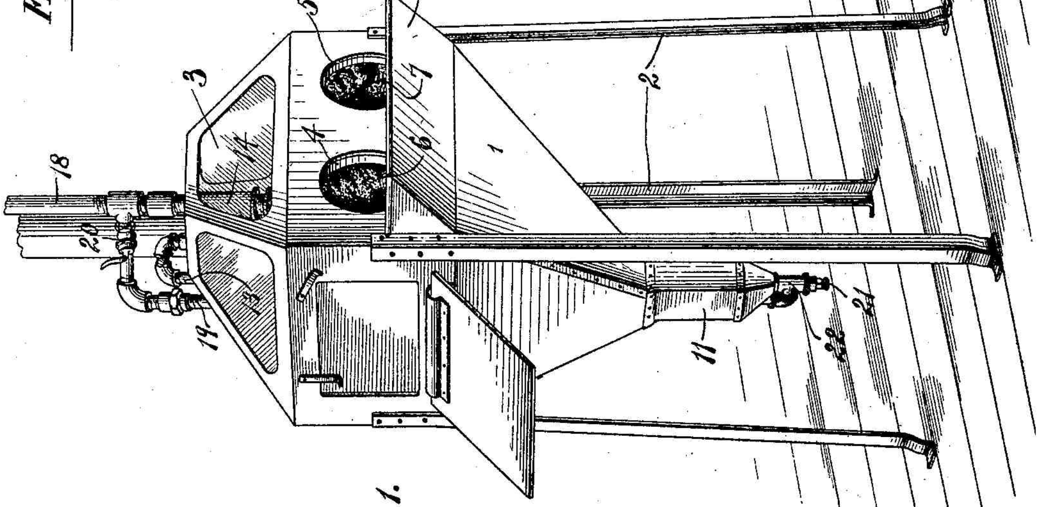

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